



Recherche expérimentale
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13431 b22285052
MAR 26 2015

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ADDITIONAL REMARKS

ON THE

POLLEN MASS IN ASCLEPIA

The following observations on the structure of the mass in Asclepiadeae are added, chiefly in connection with the account given in page 28 of the preceding issue. It is there stated, that although my early observations were essentially agreed with Mr. Bauer's figures, which represent it as having a subdivided cavity of pollen in each cell; yet a further examination led me to adopt the opinion of Treviranus and Ehrenberg, who describe its cavity as being undivided and filled with grains.

I was confirmed in this opinion on considering the mass after the production of the pollen. It appeared very improbable that the cells, under extreme tenacity, could be either suddenly and efficiently ruptured to admit of the passage of their more distant parts to the point or line of division.

The appearance however occasionally met with in the membranes proceeding, as it seemed, from the areolae of the inner surface of the mass, which had originally led me to adopt Mr. Bauer's opinion, determined me to re-examine the subject.

The result of this examination, made on *Asclepias phytolaccoides* and *purpurascens*, the former, proved that the mass in these species is cellular in all stages, as Mr. Bauer has represented it, and that in the advanced stage of the expanded flower, the cells may be seen, though with difficulty, after their grains are removed.

The pollen mass in several species of *Asclepias*, particularly *Asclepias phytolaccoides* and in *A. curassavica*, figured by Mr. Bauer, consists of cells arranged in series parallel to its sides, the middle series being more or less interrupted.

The cells of the outer layer of each side are of a size very unequal both in colour and in shape, the outer wall of each of these cells, which is the

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POLLEN MASS IN ASCLEPIADEÆ.

THE following observations on the structure of the Pollen mass in Asclepiadeæ are added, chiefly in correction of the account given in page 28 of the preceding Essay.

It is there stated, that although my earliest observations essentially agreed with Mr. Bauer's figures of the mass, which represent it as having a subdivided cavity with a grain of pollen in each cell; yet a further examination had led me to adopt the opinion of Treviranus and Ehrenberg, who describe its cavity as being undivided and filled with distinct grains.

I was confirmed in this opinion on considering the state of the mass after the production of the pollen tubes: for it appeared very improbable that the cells, unless they were of extreme tenuity, could be either suddenly removed or sufficiently ruptured to admit of the passage of the tubes from its more distant parts to the point or line of dehiscence.

The appearance however occasionally met with, of lacerated membranes proceeding, as it seemed, from the margins of the areolæ of the inner surface of the mass, added to the facts which had originally led me to adopt Mr. Bauer's view, determined me to re-examine the subject.

The result of this examination, made on specimens of *Asclepias phytolaccoides* and *purpurascens*, but especially the former, proved that the mass in these species is really cellular in all stages, as Mr. Bauer has represented it in *A. curassavica*, and that in the advanced flower bud, as in the expanded flower, the cells may be seen, though not without difficulty, after their grains are removed.

The pollen mass in several species of *Asclepias*, particularly in *Asclepias phytolaccoides* (and in *A. curassavica*, as figured by Mr. Bauer), consists of cells disposed in three series parallel to its sides, the middle series being often more or less interrupted.

The cells of the outer layer of each side have their opposite walls very unequal both in colour and thickness. The outer wall of each of these cells, which is formed by one of

the areolæ of the surface, is of a deep yellow colour, nearly opaque, and of such thickness as to prevent external bursting; the inner is of a paler yellow, semi-transparent, and so much thinner as to determine internal rupture, which in these cells, after the production of the tubes, seems to take place without regularity, and to such an extent, that after the removal of the grain the remains of the inner wall are not very readily distinguishable.

Sections of the mass indeed, both transverse and longitudinal, exhibit an appearance of cellularity; but there is here a source of fallacy, unless the contained grains are also visible in the section.

But the best proof of its being cellular is derived from the state of the central or middle series after the bursting of the mass.

The cells of this layer are of equal thickness throughout, and on the production of the tubes burst in a definite manner towards the convex edge of the mass, and at the same time generally separate from each other. They continue however to inclose the grain, or, as it may be considered, the inner membrane of the grain of pollen, whose outer membrane is formed by the cell itself; and the tenacity of this outer membrane is such that it may easily be removed from the inner without further apparent rupture.

These central grains, thus covered by their respective cells, may readily be distinguished, by their pale yellow colour and a certain degree of opacity, from the naked grains or inner membranes, which, like their tubes, are entirely colourless and transparent.

In *Asclepiadææ*, therefore, it may be said that the greatest development of the pollen grain exists, namely, a grain having an undivided cavity, whose membranes are entirely distinct, and the pollen tubes of which seem to possess the highest degree of vitality yet met with.

In accordance with the view now taken of the structure of the pollen mass, a few alterations in the preceding Essay become necessary, particularly in page 18, where the structure of the grain of pollen in *Asclepiadææ* is referred to as unfavourable to the opinion that the *boyau* of the grain is derived from its inner membrane, whereas it in reality furnishes the strongest argument in support of it.

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